

WHAT IS CLAIMED IS:

1. A phosphor sheet for a radiation detector provided to be attached to a photoelectric conversion film of the radiation
5 detector, comprising:

a support having a sheet shape; and

a phosphor layer which is provided on said support and emits light by radiation rays transmitted through a specimen, and contains a rare earth oxysulfide phosphor activated by europium of
10 concentration in a range of 0.01 mol% to 3.5 mol%.

2. A phosphor sheet for a radiation detector according to claim 1,

wherein the europium concentration in the rare earth oxysulfide phosphor is in a range of 0.1 mol% to 2.0 mol%.

15 3. A phosphor sheet for a radiation detector according to claim 1,

wherein the rare earth oxysulfide phosphor has a composition substantially expressed by

general formula: $(R_{1-a}Eu_a)_2O_2S$

20 (In the formula, R expresses at least one kind of element selected from Gd, Lu, Y and La, and a is a number which satisfies $1 \times 10^{-4} \leq a \leq 3.5 \times 10^{-2}$).

4. A phosphor sheet for a radiation detector according to claim 1,

25 wherein the rare earth oxysulfide phosphor comprises at least one selected from a europium-activated gadolinium oxysulfide phosphor and a europium-activated lutetium oxysulfide phosphor.

5. A phosphor sheet for a radiation detector according to

claim 1,

wherein said phosphor layer comprises a layer coated with powder of the rare earth oxysulfide phosphor, and the rare earth oxysulfide phosphor powder has an average particle size in a range
5 of 2 μm to 15 μm .

6. A phosphor sheet for a radiation detector according to claim 1,

wherein said phosphor layer has a surface which is layered on the photoelectric conversion film, and the surface has surface
10 roughness of 0.5 μm or less in average roughness Ra.

7. A phosphor sheet for a radiation detector provided to be attached to a photoelectric conversion film of the radiation detector, comprising:

a support having a sheet shape; and

15 a phosphor layer which is provided on said support and emits light by radiation rays transmitted through a specimen, and has a surface that is layered on the photoelectric conversion film,

wherein the surface of said phosphor layer has surface roughness of 0.5 μm or less in average roughness Ra.

20 8. A phosphor sheet for a radiation detector according to claim 7,

wherein the average roughness Ra of the surface of said phosphor layer is 0.3 μm or less.

9. A phosphor sheet for a radiation detector according to
25 claim 7,

wherein said phosphor layer comprises a layer coated with powder of the phosphor, and a filling factor of the phosphor powder in the layer is in a range of 60% to 80%.

10. A phosphor sheet for a radiation detector according to claim 7,

wherein said phosphor layer comprises a layer coated with powder of the phosphor, and the phosphor powder has an average particle size in a range of 2 μm to 15 μm .

11. A radiation detector, comprising:

a phosphor sheet according to claim 1 converting radiation rays transmitted through a specimen into light;

a photoelectric conversion film on which said phosphor sheet is layered, and which converts the light from said phosphor sheet into electric charges; and

a charge information reading section having a plurality of pixels in contact with said photoelectric conversion film and reading out the electric charges generated on said photoelectric conversion film for each of the plurality of pixels as image signals by the radiation rays.

12. A radiation detector according to claim 11,

wherein said photoelectric conversion film comprises an amorphous silicon film or a single crystal silicon film.

13. A radiation detector according to claim 11,

wherein each of the plurality of pixels comprises a pixel electrode, a charge storage capacitor storing the electric charges generated on said photoelectric conversion film via the pixel electrode, and a switching element provided corresponding to the charge storage capacitor and reading out the electric charges.

14. A radiation detector according to claim 11,

wherein said radiation detector is a radiation plane detector with the plurality of pixels arranged in an array form.

15. A radiation detector, comprising:

a phosphor sheet according to claim 7 converting radiation rays transmitted through a specimen into light;

5 a photoelectric conversion film on which the surface of said phosphor layer in said phosphor sheet is layered, and which converts the light from said phosphor sheet into electric charges; and

a charge information reading section having a plurality of pixels in contact with said photoelectric conversion film and reading out the electric charges generated on said photoelectric conversion film for each of the plurality of pixels as image signals by the radiation rays.

16. A radiation detector according to claim 15,

wherein each of the plurality of pixels comprises a pixel electrode, a charge storage capacitor storing the electric charges generated on said photoelectric conversion film via the pixel electrode, and a switching element provided corresponding to the charge storage capacitor and reading out the electric charges.

17. A radiation detector according to claim 15,

wherein said radiation detector is a radiation plane detector with the plurality of pixels arranged in an array form.

18. An apparatus for radiographic examination, comprising:

a radiation source irradiating radiation rays to a specimen;

and

a radiation detector according to claim 11 detecting the radiation rays transmitted through the specimen as image signals.

19. An apparatus for radiographic examination, comprising:

a radiation source irradiating radiation rays to a specimen;

and

a radiation detector according to claim 15 detecting the radiation rays transmitted through the specimen as image signals.